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# **Effectiveness of CAPM Model for Funds Based on Margin Trading in Chinese Market under the COVID-19 Pandemic**

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**Abstract :** The applicability of CAPM model in China was studied under the situation that the global economy was greatly affected. The results show that the stock exchange market in China is less affected by the epidemic. Still in China's securities market, the linear impact of systematic risk on the return on assets is not significant, while the non-systematic risk has a relatively significant linear impact on the return on assets. The CAPM model is not fully applicable in China's securities market. Except that the financial market in China is not sound enough, the reason for the inapplicability of the model would be the drawbacks of the model itself as the model is too sophisticated in its assumptions and there are many factors not considered, and the research direction of improving the model are summarised as pay attention to 6 types of asset pricing anomalies represented by value anomalies, and provide explanations for the causes of these pricing anomalies.

**Keywords:** COVID-19; CAPM; Applicability; Margin Trading

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## **1. Introduction**

### **1.1 Research Context**

At the end of 2019, COVID-19 began to appear and erupted around the world in early 2020. According to WHO, as at 4:03 p.m. CET, January 31, 2021, 102083344 cases of confirmed novel coronavirus pneumonia were reported in the world, and 2209195 of which were dead, which is a disaster for all mankind. Although the vaccine has been put into use, with the spread of new mutation virus, the situation is still not optimistic. As a result, with public panic and falling incomes, the financial market is deeply affected, especially for the immature Chinese market.

Since CAPM was put forward, its effectiveness on the capital market has attracted much attention, as it is the pillar of modern financial market price theory and widely used in the field of investment decision-making and corporate finance, which mainly studies the relationship between the expected rate of return of assets and risk assets in the securities market, and how the equilibrium price is formed. Scholars around the world have done a lot of empirical tests on CAPM based on different samples. For example, an empirical study on the applicability of individual stocks based on CAPM model, and the results show that CAPM model cannot fully explain the return of individual stocks, that is, market risk cannot well explain the volatility of the return of individual stocks, concluded by Chen & Feng (2020). Most of the domestic scholar's study CAPM based on stocks, but few based on funds, nor any based on the effect of COVID-19, said by Zhang (2020).

## **2. Literature Review**

CAPM originated from the portfolio theory put forward by Markowitz (1952). Its purpose is to find the effective boundary and evaluate the portfolio through the expected return and variance. Investors are rational: they want to avoid risks and get benefits as much as possible. Subsequently, Sharpe (1962) simplified the portfolio model and proposed the CAPM

model. According to Zhang (2007), western scholars have done a lot of empirical research since the 1970s just to find out that CAPM is incomplete.  $\beta$  coefficient cannot fully explain the pricing of capital assets, and the explanatory power of  $\beta$  coefficient is not enough. For example, some stocks with low beta have higher returns than those with high beta. Some scholars even conclude that the  $\beta$  coefficient is not related to the long-term average return.

This model is ineffective not only in foreign countries, but also in China. Yang (2011) selected 20 sample stocks, and used Fama and Macbeth model to carry out cross-sectional inspection of CAPM and BJS test for time series test. The results showed that CAPM model was not suitable for A-share market in Shenzhen, China, because the capital market structure of China is not complete and the market efficiency is not high. Zhang (2012) used Cross-Section Test Method and time series method to conduct empirical analysis on Shanghai stock market. Because of the limitation of sample selection, the great difference between CAPM model and reality, and the relatively immature market in China, the results show that CAPM model is invalid in Shanghai stock market. Xiao (2018) conducted an empirical test on the applicability of CAPM model in China's securities market, and finally made a conclusion that the theory only has weak applicability in Shanghai stock market. The reasons are: the mechanism of China's stock market is not mature enough, information management and disclosure are not timely, and the proportion of institutional investors is not high. Therefore, it puts forward some reasonable suggestions, such as strengthening the construction of laws and regulations, improving the investment structure, and strengthening the market regulation mechanism. "An empirical study on the applicability of individual stocks based on CAPM model, and the results show that CAPM model cannot fully explain the return of individual stocks, that is, market risk cannot well explain the volatility of the return of individual stocks." Said by Chen & Feng (2020).

However, since the model was proposed, the dispute over its effectiveness has never stopped according to Jiang (2020). At the early stage, Black, Fama and Mac Beth were the main literature which examined CAPM from cross section. These researches provide strong support for the consistency between the theory of CAPM and the empirical evidence, that is, there is a significant positive relationship between the systematic risk beta of assets and their expected return rate. But in the late 1970s, more and more empirical evidence began to contradict the prediction of CAPM theory, and a large number of research results even no longer support Black's zero beta CAPM.

### 3. Discussion

That even in the first trading day of the outbreak, the value began to rise rapidly. It is due to the indirect impact of the epidemic on the US stock market and oil prices that the Chinese stock market fell sharply in March to 2646.8, and it took months to recover. Same results have also been found by Zhang, Wang & Zeng. Since January this year, the first decline in the global stock market was basically based on the market's adjustment to the epidemic situation and the epidemic situation in China and Asia, showing a slight decline. Soon China was closed to Wuhan, and the people generally believed that China could control the epidemic well, so the market began to rebound strongly again. The following significant decline was the large-scale spread of the epidemic in the United States, Europe and the world, and was faced with a state of loss of control, or even 4 consecutive times of circuit breaker. In fact, this is mainly due to the fluctuation of governments in the treatment of the epidemic, from group immunity to social distance to isolation and control, said by Wu (2021). This policy has generated great uncertainty, so the market of economic forecast at that time was very pessimistic. During the epidemic, China's stock market outperformed all the world's stock markets. However, when the world's stock market is facing continued volatility and adjustment, China's stock market will also experience volatility and adjustment. In July, driven by the easing of the epidemic, the full resumption of work and the government's incentive policies, the stock market naturally ushered in a sharp rise, which also benefited from the long-term accumulation of China's economy according to Wang (2021).

The purpose of this paper is to select the ETF of margin financing and securities lending target: first, ETF has the characteristics of both the closed-end fund can be purchased and redeemed on the exchange and the open-end fund can buy and sell fund shares on the spot and off the market, which means that it can carry out risk-free arbitrage in theory, so that its income can more effectively reflect market information. Second, ETF, as an index fund, aims to track the index and can be regarded as portfolio investment. It can be traded in the secondary market, which enables a large number of small investors to carry out portfolio investment, closer to the assumption that all stocks in the CAPM can be subdivided indefinitely. Third, the

subject funds of margin financing and securities lending can be short, which is close to the assumption that all assets in CAPM can be short. We can see from the results that the linear effect of systematic risk on return on assets is not significant and the coefficient is negative, which indicates that the higher the systematic risk is, the lower the return is, which is completely inconsistent with the assumption of CAPM model. At the same time, there is a significant linear relationship between the non-systematic risk and the return on assets, but the value of the coefficient is negative, which means that with the increase of the non-systematic risk, the return on funds will decrease, which is contrary to the assumption that investors are risk averse in CAPM, and there is speculative behaviour. And these results are almost the same as those in the research of Zhang (2020). Finally, different results from 2 different time intervals suggest that it may be more effective to include data with greater amplitude when calculating systemic risk. Therefore, a turning point cannot be regarded as a dividing point. In summary, CAPM is not fully applicable in China's current securities market, and investors should use it cautiously when forecasting asset prices.

According to the literature review, the CAPM model is not applicable to other countries either, especially in recent years by Jiang (2021). To tell the causes of the ineffectiveness of this model, there are probably two reasons. First, despite the careful selection of data, the real securities market still cannot meet the complicated preconditions of CAPM model, and such a perfect market will not appear for a long time to come according to Zhang (2007). Secondly, the problems encountered in CAPM empirical testing may be due to the failure of the theory itself caused by the departure of theoretical assumptions from the real world, or the failure of the constructed testing environment to meet the requirements of the theory itself. For example, Roll (1977) believes that the core of testing CAPM is to find Efficient Frontier, which includes not only securities financial assets, but also commodities, real estate, collectibles, human capital, etc. Therefore, CAPM has never been truly tested in a strict sense, and this argument is known as the famous "Rolle's Critique". The proposal of "Rolle's criticism" further illustrates that it is almost impossible to complete the academic problem to verify the authenticity of CAPM, that is, CAPM cannot be verified or falsified. However, Fama (2014) believes that the fate of CAPM is destined to end if the systemic risk beta fails to explain the difference effectively and uniquely in asset yields.

## 4. Conclusions

The experimental results further indicate that the CAPM model is not suitable for the Chinese market. Although China has opened the trading system of margin financing and securities lending and improved the capital market of China, the applicability of CAPM in the capital market of China is not strong. The return on assets in China is still greatly affected by non-systematic factors, and the return is not entirely the risk premium from systematic risks. Apart from the imperfection of the Chinese market, there is still room for improvement in the model itself. Asset pricing model itself can be used to answer the model benchmark of market operation, but academic research should further explore the economic mechanism behind each pricing factor in the pricing model. Only a clear answer to the inherent principle of the pricing factor itself can help people deepen their understanding of the operating mechanism of the stock market.

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